

[10191/2129]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : LAERMER et al.
Serial No. : To Be Assigned
Filed : Herewith
For : PLASMA ETCHING EQUIPMENT
Art Unit : To Be Assigned
Examiner : To Be Assigned

Assistant Commissioner
for Patents
Washington, D.C. 20231
Box Patent Application

**PRELIMINARY AMENDMENT AND
37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT**

SIR:

Please amend the above-identified application before examination, as set forth below.

IN THE SPECIFICATION AND ABSTRACT:

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification (including the Abstract, but without claims) accompanies this response. It is respectfully requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

IN THE CLAIMS:

On the first page of the claims, first line, change "What is claimed is:" to:
--What Is Claimed Is--.

Please cancel original claims 1 to 16, without prejudice, in the underlying PCT
Application No. PCT/DE01/01777.

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Please add the following new claims:

17. (New) A plasma etching equipment for performing an anisotropic etching of a substrate by an action of a plasma, comprising:
 - a first plasma-generating device including:
 - a first arrangement for generating a first high-frequency electromagnetic alternating field,
 - an etching chamber for generating a first plasma of reactive particles by an action of the first high-frequency electromagnetic alternating field upon a first reactive gas, and
 - a first gas supply, the substrate to be etched being positioned in the etching chamber; and
 - a second plasma-generating device that is preconnected to the first plasma-generating device and that includes:
 - a second arrangement for generating a second high-frequency electromagnetic alternating field,
 - a plasma-generating region for generating a second plasma from the reactive particles by an action of the second high-frequency electromagnetic alternating field upon a second reactive gas, and
 - a second gas supply, the second plasma being able to be supplied at least partially, as the first reactive gas, to the first plasma-generating device via the first gas supply.
18. (New) The plasma etching equipment according to claim 17, wherein:
 - the first plasma-generating device is an inductively coupled plasma-generating device, and
 - the first arrangement includes at least one ICP coil.
19. (New) The plasma etching equipment according to claim 17, wherein:
 - the first plasma-generating device includes:
 - a high-frequency voltage source,
 - a supply line, and

a substrate electrode connected to the high-frequency voltage source by the supply line and with which an ion stream contained in the first plasma can be accelerated onto the substrate.

20. (New) The plasma etching equipment according to claim 17, wherein:
the second arrangement includes a microwave generator, and
the second plasma-generating device is a microwave plasma-generating device.
21. (New) The plasma etching equipment according to claim 20, wherein:
the microwave generator includes one of a magnetron and a magnetron tube.
22. (New) The plasma etching equipment according to claim 17, wherein:
the second plasma-generating device includes a cavity resonator.
23. (New) The plasma etching equipment according to claim 20, wherein:
the second plasma-generating device includes a cavity resonator.
24. (New) The plasma etching equipment according to claim 22, wherein:
the cavity resonator includes a tuning device for tuning a resonant frequency of the cavity resonator.
25. (New) The plasma etching equipment according to claim 23, wherein:
the cavity resonator includes an adaptation device for adapting a microwave mode generated by the microwave plasma-generating device to the second plasma.
26. (New) The plasma etching equipment according to claim 25, wherein:
the microwave plasma-generating device includes at least one directional coupler and is in contact with an absorber of microwave radiation.
27. (New) The plasma etching equipment according to claim 26, wherein:
the absorber includes a water load.

28. (New) The plasma etching equipment according to claim 17, further comprising:
a dielectric tube via which the first plasma-generating device and the second
plasma-generating device are connected to each other and are open to a passage of gas,
wherein:

the dielectric tube is in contact with the first gas supply and the second gas
supply in a manner open to the passage of gas.

29. (New) The plasma etching equipment according to claim 28, wherein:
the dielectric tube includes one of a quartz tube and a ceramic tube.

30. (New) The plasma etching equipment according to claim 22, further comprising:
a dielectric tube via which the first plasma-generating device and the second
plasma-generating device are connected to each other, wherein:

the plasma-generating region is located inside the cavity resonator in a
surrounding of the connection of the first plasma-generating device to the second
plasma-generating device on an inside of the dielectric tube that crosses the cavity
resonator in some regions.

31. (New) The plasma etching equipment according to claim 28, wherein:
the dielectric tube forms the second gas supply.

32. (New) The plasma etching equipment according to claim 17, further comprising:
a discharge device arranged between the first plasma-generating device and the
second plasma-generating device, the discharge device at least partially discharging at least
one of ions and electrons from the second plasma.

33. (New) The plasma etching equipment according to claim 32, wherein:
the discharge device can be heated.

34. (New) The plasma etching equipment according to claim 32, further comprising:
a dielectric tube via which the first plasma-generating device and the second
plasma-generating device are connected to each other, wherein:

the discharge device is positioned inside at least one of the dielectric tube and near an entrance of the first gas supply into the first plasma-generating device.

35. (New) The plasma etching equipment according to claim 32, wherein:
the discharge device is one of a metallic grid, a ceramic grid, a perforated plate, and a showerhead.
36. (New) The plasma etching equipment according to claim 32, wherein:
the discharge device is positioned between the first plasma-generating device and the second plasma-generating device in such a way that the first reactive gas that can be supplied to the first plasma-generating device via the first gas supply passes through at least almost completely through the discharge device.

Remarks

This Preliminary Amendment cancels original claims 1 to 16, without prejudice, in the underlying PCT Application No. PCT/DE01/01777. The Preliminary Amendment also adds new claims 17-36. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) are respectfully requested.

The underlying PCT Application No. PCT/DE01/01777 includes an International Search Report, dated October 9, 2001, a copy of which is submitted herewith.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,

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Dated: 1/18/02

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